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COUNTRY AND INTERCOUNTRY PROGRAMMES AND PROJECTS

PROJECT RECOMMENDATION OF THE ADMINISTRATOR

Supplementary assistance for a global project

Testing and Demonstration of Small-Scale Solar-Powered Pumping Systems (GLO/78/004)

Estimated UNDP contribution:	$1 250 000
Duration:	12 months
Executing Agency:	World Bank

I. Background

1. The Governing Council at its twenty-fifth session in June 1978 approved $1,176,105 for the global project, Testing and Demonstration of Small-Scale Solar-Powered Pumping Systems. 1/ Supplementary assistance for the project in the amount of $45,000 was subsequently approved by the Council at its twenty-seventh session in June 1980. 2/ When the latter allocation was approved, it was expected that the present phase of the project would be completed under it, and that a second phase, extending project operations to a larger number of countries, would be ready for submission to the

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* This document will be derestricted upon approval of the project. See document DP 1526 which will be issued in June 1981.

1/ DP/PROJECTS/R.10/Add.1.

2/ DP/PROJECTS/R.13/Add.3.

Council at its twenty-eighth session. Following a comprehensive review of the project and the results achieved to date, the Administrator has decided that a one-year extension of the current phase is desirable to permit more thorough planning of the second phase project, and to investigate the feasibility of broadening the scope of the next phase to include testing and demonstration of other renewable energy technologies.

2. The basic objective of the current project has been to develop, drawing upon existing technologies to the maximum extent possible, small-scale pumping systems for irrigation and drinking water supply which: (a) utilize solar power as their energy source; (b) are sufficiently low-cost for adoption by small farmers and village communities; (c) have simple operation and maintenance requirements; and (d) have good prospects for manufacture and/or assembly in developing countries. Eleven pumping systems that give promise of meeting the above criteria are currently undergoing field testing and comprehensive monitoring in three countries, namely, Mali, the Philippines and Sudan. Ten of the systems are photovoltaic, and one is thermal. In addition, data have been gathered on additional solar thermal units undergoing tests at manufacturers' sites in India, Israel, Italy and the Federal Republic of Germany. Intensive laboratory testing of corresponding subsystems in the United Kingdom and the United States of America have also been carried out.

3. The project represents the most systematic effort to date to monitor rigorously the performance of solar pumps under field conditions in different geographical and agricultural areas. Project activities have produced a great deal of valuable and hitherto unavailable information that will assist in the design of improved systems realistically adapted to developing countries' requirements. Based on data presently available, a start has been made on improved system design studies as well as on a computer model which will be used as a design guide in matching the various components of the pumping system to ensure optimum operation for a particular site. To complete the data base, some of the units that arrived in the field most recently should be subjected to further testing and monitoring; and some others should be shifted from their present locations at collaborating research laboratories in the participating countries to actual farm sites. Finally, before the parameters of the second phase project are fully decided upon, the state-of-art review carried out at the beginning of the project should be up-dated to take account of the technological developments in solar-pumping that have taken place over the past two years. The proposed one-year extension will also offer an opportunity to consult in depth with additional developing countries interested in participating in the next phase of the project.

4. It is suggested that the scope of the project be broadened in its next phase to include work on renewable energy technologies other than solar water pumping. Important as the latter is, developing countries face a variety of energy needs in numerous sectors and the potential contribution of different renewable energy technologies, including other solar devices, merits intensified exploration. There appear to be few countries in the developing world today that do not have renewable energy programmes of some sort under way, and several donors have made support for

such programmes a high priority. These programmes consist largely of R and D type of activities, linked with testing. While much useful work is certainly being done, the effort world-wide is fragmented and dispersed over many countries and institutions, most of which are working at a sub-critical level with insufficient provision for the dissemination and exchange of results. There is also risk of considerable duplication among them. The forthcoming United Nations Conference on New and Renewable Energy Sources seems certain to generate further interest. It is becoming increasingly urgent, therefore, to obtain a more comprehensive view of the work that is currently under way on various renewable energy technologies to determine how efforts may be strengthened and better co-ordinated, and existing gaps filled. The critical area is in the field of testing and demonstration. With few exceptions, renewable energy technologies exploit energy resources and scientific and engineering principles that have been long understood. However, the details of equipment design and site selection, which are often crucial to applications that will be technically and economically successful, are difficult to specify in advance. Field testing and demonstration is therefore a critical step in moving new energy technologies from the laboratory into the hands of developing country users. During the extension of the present project, it is accordingly proposed to review the work that is currently under way on various renewable energy technologies, and make recommendations for significantly strengthening the worldwide testing and demonstration effort.

II. The project

5. The principal objective of the proposed 12-month extension of the project is to prepare the way during the third programming cycle for an expanded programme for the testing and demonstration of small-scale solar pumping systems meeting the criteria referred to in paragraph 2 above. This will be accomplished by: (a) continuation of the current testing programme for the purpose of obtaining more complete and comprehensive data; (b) use of the data acquired to redesign systems; (c) procurement and testing of a few improved prototypes for drinking water supply as well as irrigation applications; (d) selection of additional countries interested in participating in the project, through field missions designed to discuss with Governments their small-scale pumping requirements and technical and institutional capacity to collaborate effectively in the project; and (e) further investigation of the technical and economic potential for solar pumping and the potential for local manufacture. These activities are expected to result in detailed recommendations for a second phase project to be submitted to the Governing Council at its June 1982 session.

6. A second objective of the proposed extension is to investigate ways of strengthening, supplementing and better co-ordinating the testing and demonstration work currently under way in many countries on various renewable energy technologies. Emphasis will be placed on low-level technologies suited to the needs of rural areas and traditional sectors of the economy. Renewable technologies meeting these criteria include wind pumpers, biogas (anoerobic digestion), gasification of biomass, crop dryers, wood-burning stoves, solar cookers, and small hydroelectric plants. This list is not meant to be exhaustive, and relative priorities among the various categories are under further study.

7. Under this component of the project, a series of state-of-the art studies will be carried out that will comprise: (a) a review of testing and demonstration work currently under way in each technology; (b) an assessment of the near- or medium-term readiness of the technology for developing country applications; (c) an assessment of the need for further testing and demonstration as a means of accelerating the development or application of the technology; and (d) where further field testing is indicated, recommendations for the design and scope of a suitable programme. In implementing this component of the project, the World Bank will consult closely with other agencies of the United Nations system and draw upon their expertise with reference to those technologies in which a given agency may have special experience or competence.

8. The expenditure components of the proposed supplementary assistance are as follows:

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Personnel	440 000
Subcontract	650 000
Training	100 000
Miscellaneous	60 000
Total	1 250 000

The proposed UNDP contribution for the second half of 1981, estimated at $330,042, will be contained within the Global Indicative Planning Figure (IPF), established by the Governing Council for the current cycle, and the balance within the Global IPF established for the third cycle.

III. Recommendation

9. In the light of the above, the Administrator recommends that:

The Governing Council,

(a) Approve the proposed supplementary assistance; and

(b) Authorize the Administrator to make the appropriate arrangements with the World Bank for the extension of the project.